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TITLE 3 IRIDITING OF 60B32066 BONDS 6

MODEL NO. SAT V/S-LC CONTRACT NO. NAS8-5608 29ACV

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## ABSTRACT

Lap shear specimens bonded with 60B32066 adhesive (Narmco 7343/7139) were tested in tensile - shear at -320°F at intervals of one day and thirty days after being subjected to a modified BAC 5726 brush iridite to determine the strength loss caused by the iridite solutions.

Both the one day and the thirty day results showed an approximate 12% strength degradation indicating that the iridite solutions have a relatively fast but non-continuing detrimental effect on 60B32066 bonds. Although loss of bond strength increased with time it did so from the effects of humidity rather than from the iridite effects.

## KEY WORDS

Iridite

Non-iridite

Lap Shear

Tensile-Shear

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1.0 OBJECT

To determine the effect of brush iridite 14-2 per BAC 5726 on 60B32066 adhesive bonds.

2.0 BACKGROUND

Potential bond degradation can occur from BAC 5726 touch-up iriditing along the edge areas of 60B32066 adhesive bondlines. This laboratory study was conducted to provide data as to the degree of this degradation.

3.0 CONCLUSIONS

Brush iridite 14-2 per BAC 5726 will degrade 60B32066 adhesive bond strength to some degree but this effect is reduced if the milder iriditing procedures in BAC 5726 are employed.

4.0 RECOMMENDATIONS

When-necessary to brush iridite along 60B32066 adhesive bond-line edges:

1. Insure the adhesive is well cured per 60B32067 before iriditing.
2. Use the shortest cycle and least drastic iridite condition called for per BAC 5726.

5.0 TEST PROCEDURES

Forty lap bond shear test specimens were prepared with 60B32066 adhesive per 60B32067.

After completion of the cure cycle one half (20) of these specimens were subjected to a modified 14-2 brush iridite per BAC 5726. The other half were used as control specimens. This modified procedure, which was more drastic than would normally be used, was as follows:

Brush iridite per BAC 5726 except dip the specimen in the iridite solution instead of brushing to assure continuous solution contact. Retain in the 90 to 95°F solution for 15 minutes.

In order to determine how quick the iridite solution weakened the bondline and how long the degradation continued, one half of the iridited and one half of the control specimen were tested one day after iriditing and 30 days after iriditing. During this 30 day period specimens were stored under ambient laboratory atmospheric conditions. Specimens were tested at -320°F in accordance with 60B32066.

## 6.0

TEST RESULTS

Individual test results are tabulated in Tables II and III. Table I, summarizes and analyzes this data. Figure 1, shows a plot of high, low and average values.

TABLE I

Summary and Analysis of -320°F Tensile-Shear Results-Iridited vs. Non-Iridited  
60B32066 Adhesive

(TESTED 1 DAY AFTER IRIDITING)					
DATA →	1	2	3		
	(P.S.I.)	(P.S.I.)	(%)		
AVG.	3497	3960	88.3		
HIGH	5030	5051	99.5		
LOW	2319	2747	84.3		
RANGE	2611	2304	113.0		
(TESTED 30 DAYS AFTER IRIDITING)					
DATA →	1	2	3	4	5
	(P.S.I.)	(P.S.I.)	(%)	(%)	(%)
AVG.	2783	3148	88.5	79.7	79.7
HIGH	3662	4384	83.7	72.9	86.8
LOW	1875	2061	90.8	80.9	77.9
RANGE	1787	1323	135.0	68.5	57.4
1.	Iridited				
2.	Non-Iridited (CONTROL)				
3.	Iridited as % of Non-Iridited				
4.	30 Day Iridite as % of 1 Day Iridite				
5.	30 Day CONTROL as % of 1 Day CONTROL				



## 6.2 DISCUSSION OF RESULTS

Results of specimens tested one day after iriditing showed an average strength loss of about 12%. Comparison to corresponding 30 day test results showed that strength loss continued; but this continued degradation is believed to be caused by atmospheric humidity rather than the iriditing process. This statement is made on the basis of comparison of 30 day test results of iridited specimens versus 30 day test results of non-iridited specimens (Table I) together with test data which shows that 60B32066 bonds are adversely affected by humidity.<sup>(1)</sup>

In summary, the test results indicate that 60B32066 bond strength is adversely affected, to some degree, by BAC 5726 iriditing process. Also the degradation appears to take place during or relatively soon after iriditing and is not a continuing effect.

## 7.0 REFERENCE

- (1) "Optimization of the Performance of A Polyurethane Adhesive System Over the Temperature Range of -423°F to +200°F", Herman Holland and Alfred H. McLeod, 14 March 1966, Wattaker Corporation, Narmco Research & Development Division, San Diego, California.

TEST SPECIFICATION 60B32067 LAP SHEAR  
 TEST TEMPERATURE -320°F  
 TEST RATE 1200-1400 LBS./MIN.  
 TENSILE TEST MACHINE BALDWIN 20K NASA 045482

IRIDITE 14-2 PER  
 BAC 5726

BOND			ULT. STRENGTH					
SPEC.	WIDTH	LAP	THICK- NESS	LOAD	STRESS			
NO.	(IN)	(IN)	(MILS)	(LBS)	(PSI)			
(Tested 1 Day After Iriditing)								
2	0.99	0.52		1905	3700			
6	"	0.49		1125	2319			
10	"	0.51		1095	2169			
14	"	0.51		2250	4456			
18	"	0.49		2440	5030			
22	"	0.50		1490	3010			
26	0.98	0.50		2020	4122			
30	1.00	0.52		1330	2558			
34	0.99	0.49		1800	3711			
38	0.99	0.51		1966	3894			
AVERAGE					3497			
(Tested 30 Days After Iriditing)								
4	0.99	0.52		965	1875			
8	"	0.50		1210	2444			
12	"	0.50		1425	2879			
16	"	0.49		930	1917			
20	"	0.49		1510	3113			
24	"	0.50		1180	2384			
28	"	0.51		1630	3228			
32	"	0.49		1440	2968			
36	0.98	0.51		1849	3662			
40	0.99	0.49		1630	3360			
AVERAGE					2783			

CALC			REVISED	DATE
CHECK				
APR				
APR				

TABLE 3  
 Tensile-Shear Strength of Iridited  
 60B32066 ADH. Bondlines

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TEST SPECIFICATION  
TEST TEMPERATURE  
TEST RATE  
TENSILE TEST MACHINE

60B32067 LAP Shear  
-320°F  
1200-1400 LBS./MIN.  
BALDWIN 20K NASA 045482

NO IRIDITION (CONTROL)

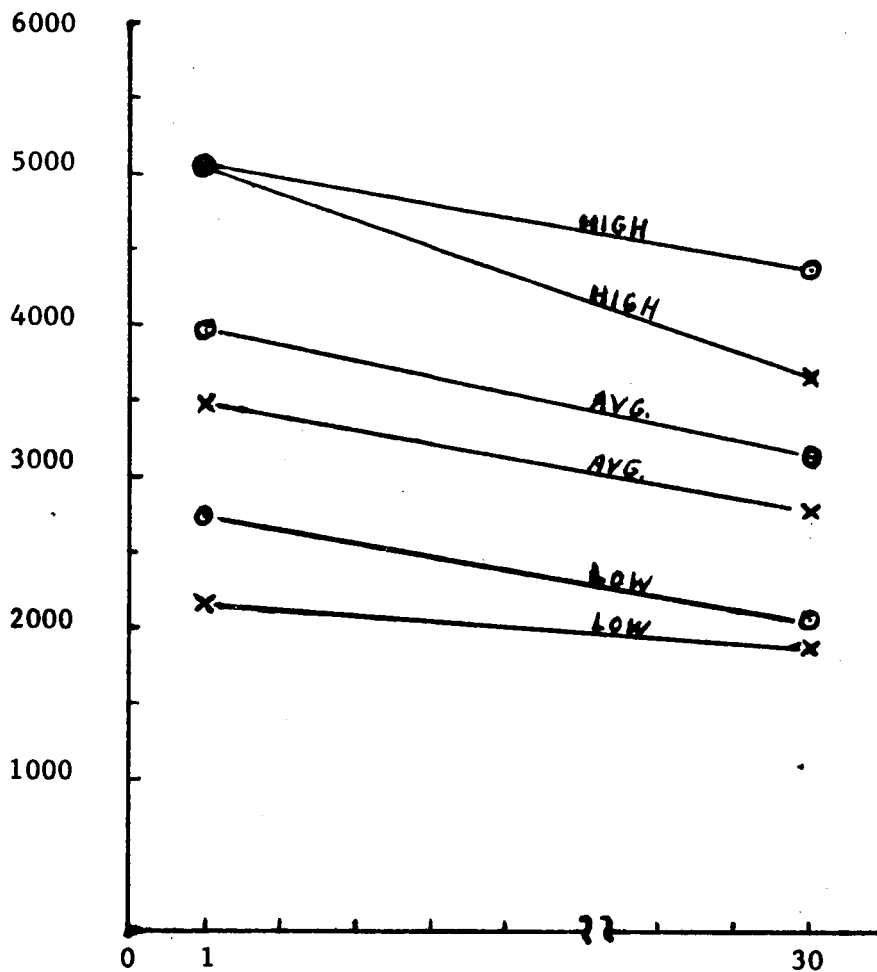
BOND				ULT. STRENGTH				
SPEC.	WIDTH	LAP	THICK- NESS	LOAD	STRESS			
NO.	(IN)	(IN)	(MILS)	(LBS)	(PSI)			
(Tested 1 Day After Iriditing Table II Specimens)								
1	0.99	0.52		1450	2817			
5	"	0.52		2155	4186			
9	"	0.50		1360	2747			
13	"	0.50		2500	5051			
17	"	0.49		1475	3041			
21	"	0.50		2210	4465			
25	"	0.50		2300	4646			
29	"	0.52		1120*	2176*	SLIPPED IN GRIP. (THROW OUT)		
33	"	0.49		2125	4381			
37	"	0.52		2215	4303			
AVERAGE					3960			

Tested 30 Days After Iriditing Table II Specimens

3	0.99	0.52		1545	3001			
7	"	0.49		1000	2061			
11	0.98	0.50		1500	3061			
15	1.00	0.51		2240	4392	TEST RATE TOO FAST (THROW OUT)		
19	0.99	0.49		1630	3360			
23	"	0.50		1500	3030			
27	"	0.51		1330	2684			
31	"	0.50		1575	3182			
35	"	0.50		1790	3616			
39	"	0.50		2170	4384			
AVERAGE					3148			

CALC			REVISED	DATE	TABLE 1 Tensile-Shear Strength of Non-Iridited 60B32066 ADH. Bondlines	T5-6556-1
CHECK						
APR						
APR						
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-320°F Tensile - Shear Strength -- p.s.i.



No. Of Days After Iridite Treatment

	INITIALS	DATE	REV BY INITIALS	DATE	TITLE	MODEL
CALC					COMPARISON OF IRIDITED & NON-IRIDITED 60B3206 ADHESIVE BOND STRENGTH FIGURE 1	
CHECK						
APPD.						
APPD.						

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